Mass Change Designated Observable Community Telecon
4/13/20 Q&A Transcription
Primary

Telecon Attendance

Ali Behrangi	Junyi Guo	Shelley Petroy
Peter Bender	Felipe Guzman	Chris Piecuch
William Bertiger	Bruce Haines	Rui Ponte
Bernard Bienstock*	Ryan Hardy	Riccardo Riva
Jean-Paul Boy	Scott Horner*	Matt Rodell*
Ian Brosnan*	Bruce Howe	David Sandwell
Don Chambers	Erik Ivins	Jeanne Sauber
Wei Chen	Sujay Kumar	Peter Schaadt
Vicki Childers	Felix Landerer	CK Shum
Bruno Christophe	Jennifer Lee	Christian Siemes
Jon Chrone*	Frank Lemoine	Alex Sun
John Conklin	Bailing Li	Michael Veto
Mike Croteau	Wen-Hao Li	Brent Ware
Pavel Ditmar	Min-Hui Lo	Matthias Weigelt
Eugene Fahnestock*	Bryant Loomis*	Amanda Whitehurst*
Ichiro Fukumori	Mioara Mandea	David Wiese*
Alex Gardner	Dallas Maters	Matthias Willen
Robert Gaston	Chris McCullough*	Anthony Yu
Manuela Girotto	Jurgen Muller	Dah-Ning Yuan*
David Goggin	Steve Nerem	Chaoyang Zhang
Brian Gunter	Roland Pail	Yu Zhang
		Victor Zlotnicki*

* Members of the Mass Change Team

Questions and Answers

Q1 (Felix Landerer): What is the baseline mission duration for the next MC observing system?
A1 (David Wiese): We have not yet built in mission duration explicitly into the value framework - this is work to be done. Mission duration is a factor in specifying the mission class (in a NASA definition) in terms of the mission reliability and it will directly affect costs. Mission duration is also determined by the flight system consumables. In addition, another factor is the S/C altitude and the S/C design features. Mission duration could be enhanced via a drag compensation system. Our MC team has discussed that for each architecture, we will quantify the consumables and this parameter will be the main driver in the life, assuming S/C hardware reliability is not a factor. Mission duration is not explicitly built into the value framework at this time, however we recognize that length of the data record is an important parameter.

Q2 David Sandwell: What about the timing of the solar maximum in 2025? Would it be better to launch after that date?
A2 Jon Chrone: There is considerable uncertainty of when the solar maximum will occur. The assumptions we are using include a couple of different profiles with an earlier or later peak. All this plays into the numbers in the variation of the GRACE-FO orbit altitude beginning to drop

down in 2026 or perhaps into the 2030s. A briefing from the joint NASA/NOAA international committee report at AGU in December 2019 indicated that cycle 25 was looking a bit more benign than previously predicted. In fact, we could be at solar minimum now, but we won't be able to confirm this for several more months. The timing of the solar maximum is still in flux. We should know more in the next 8-12 months. Typically, you don't know you've hit solar minimum for 6-8 months. We have to wait and see how it all plays out.

Q3 Bruce Howe: Can you elaborate on what are the largest error components for the tide de-aliasing. What is the largest target to reduce tide aliasing problems? What should the tide community focus on?
A3: David Wiese: We are unsure of the largest constituent that limits the gravity retrievals relative to others. There has been considerable work published by the community on where the errors are geographically dominant. Primarily the largest errors are at the high latitude regions, under the Antarctic ice shelves or in the Hudson Bay, etc. So in a geographic sense, that is where we would expect see the greatest improvement in terms of our gravity retrievals of improved tidal models.

Q4 Dallas Masters: What activity for small sat/constellations were funded, among the three items funded on an early slide?
A4: David Wiese: The GeoOptics SmallSat/CubeSat Constellation technology effort was funded to continue their work on SmallSats implementation for SST. The SOW has been submitted to NASA HQ for approval and it focuses on many aspects of the system design.

Q5: Chaoyang Zhang: Are there any changes between GRACE and GRACE-FO on the accelerometer error patterns especially on the low frequencies (low degree)?
A5: David Wiese. Yes there are changes. With GRACE-FO, we have one accelerometer on GRACE-FO 2 that is underperforming, so we decided not to use that data. It is still returning realistic measurements of the non-gravity acceleration so there are studies underway to improve the data processing strategies so we can use those measurements. We noted in the GRACE-FO data that the low frequencies are impacted more than in GRACE. Typically we see a degradation in recovering the C_{30} coefficient, so the science data system team has recommended that this low frequency coefficient is replaced by one derived from satellite laser ranging. A full characterization of the low frequency error content in GRACE-FO vs. GRACE is currently a very active area of research and one that is not completely understood at this point, but is actively being investigated.